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ABSTRACT

The hazard of fire is of great concern to libraries due to combustible books and new plastics used in construction and interiors. Building codes and standards can offer architects and planners guidelines to follow but these standards should be closely monitored, updated, and researched for fire prevention. (DS)

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BUILDING CODES AND REGULATIONS

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It is my pleasure to speak with you today on building codes and regulations and what influence they have on our lives.

Building codes have been with us for a long time. King Hammarabi probably could be considered one of our earliest building officials back in 1750 B.C. in the ancient fortress city of Babylon.

A little closer in time, Sir Henry Wotton, a 17th Century English diplomat and writer included architecture among his interests and wrote these code provisions: "To make a complete staircase, is a curious piece of architecture, the vulgar cautions are these:

"That the space above the head, be large and airy, because a man doth spend much breath in mounting.

"That the half pace be well distributed, at competent distance, for reposing on the way.

"That the breadth of every single step or stair be never less than one foot nor more than eighteen inches.

"That they exceed by no means half a foot in their height or thickness, for our legs do labor more in elevation than distance."

The simple good sense of Wotton's code requirements are sometimes overlooked today.

Let's get closer to home.

Building codes as we know them today extend back to the early 1900's. And it is no secret that in the early days codes were written by insurance interests and were basically concerned with the structure and not the occupant. However, our modern day building codes consider both life safety and property to a degree which I will explain later.

One of the biggest problems in our country today is fire. 12,000 Americans die each year as the result of destructive fire and 300,000 are injured. In economic terms, the price of destructive fire amounts to at least 11.4 billion dollars per year. Of this 2.7 billion dollars are in direct property loss. On any measuring basis, the United States record of fire loss is the worst in the world.

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The public, according to the National Commission of Fire Prevention and Control is indifferent to, and ignorant of, the heavy toll of distructive fire. The hazard of fire is changing. New materials, new devices and products, new methods and technologies are appearing daily in use. At the same time, knowledge of fire and smoke development, spread and effects are woefully inadequate. The low priority given in this country to fire research efforts, especially when funding is necessary is at once a sign of indifference and resignation while at the same time being a continued cause of ignorance.

Unfortunately, most buildings which will suffer fire damage in the future already have been built, often many years before the development of modern building codes. Further, it is unfortunate that many buildings will continue to be built without the design knowledge that we urgently need. With these limitations known, the architect has a unique opportunity to bring about long term reduction in the Nation's fire loss of life and property.

The architect is the one person who must answer the difficult design questions posed by the threat of fire. When is an atrium hazardous? How dangerous are exit stairways which are technically separated from one another? If a fire starts in a library will everyone be able to escape? Will fire retardant materials add to the likelihood of destruction? How much fire protection is necessary? Is a particular code requirement adequate for life safety? We must always be aware that building code requirements are minimum requirements for life safety and protection of property.

Libraries have an important role in preserving a Nation's heritage. They also provide a vital used tool for education. The term "Library" covers an extreme wide range of situations; a Library can be a small, special, or house a valuable collection in a private home or other building or it can be a separate section in a building used for many purposes. It can also be a multi-million dollar complex of buildings, perhaps some high rise, whose purpose is to provide not only for storage of books, but also study and reading areas, catalog rooms, work rooms, binderies, art collections, shops and places of public assembly. All libraries have one characteristic in common; ample fuel in the form of books that can burn and contribute to a serious fire, even in the absence of other combustibles.

Each library should be evaluated on an individual basis. Consideration of the life safety as well as the value of the content. The location, the type of construction, the arrangement of the building, the type and availability of fire fighting equipment are just some of the items that should be considered.

Although the probability of fire striking an individual library may be low when compared to other occupancies, fires do occur with considerable regularity and with serious results.

When you look at the record, you will find numerous fires caused by torches, ignition of escaping gas, use of small gauge electric extension cords...especially for small motors and heating appliances, xerographic copying equipment and exposure from nearby burning structures.

Building Codes and other standards will give the planner an opportunity to design his facility. Fire detection systems and automatic extinguishing systems should be considered in planning. Improvement of fire protection should be considered also for existing libraries. Alterations and renovation of existing facilities should be considered with caution. It is during the period of reconstruction that extreme fire hazards exists. Good house keeping is also important.

In these United States, we have four model codes that are used extensively. They are:

International Conference of Building Officials
ICBO - Uniform Building Code

Building Officials and Code Administrators Int'l.
BOCA - Basic Building Code

Standard Building Code Congress
SBCC - Southern Standard Building Code

American Insurance Association
A Isur A - National Building Code

Each one of the model codes vie for acceptance. The ICBO Uniform Building Code is principally used in the western states, Alaska and Hawaii. The BOCA Code is used in the mid-west, northern and eastern portions of the states. The SBCC is used in the mid and south Atlantic and south eastern states. It is not uncommon to have different codes while cities within the state will adopt another model code or their own code. You can imagine the situations an owner, or designer, might find himself in.

The Federal Government recognized the situation and threatened to promulgate a national code. The Council of American Building Officials through the recently formed Model Code Standardization Council has taken steps to standardize the model codes. For the past two years they have been working toward that end.

The model building codes are printed every three years, however, code changes are adopted every year at an annual business meeting.

You may be interested in the code change procedure. Approximately 1,000 code changes are considered each year. Code changes are submitted by building officials, manufacturers (through building officials) and professional organizations such as, architects and engineers. These are referred to sub-committees for action. If they are approved, they are referred to the Code Change Committee. If the Code Change Committee approves the proposed code change, they are passed on to the voting membership. Only building officials are allowed to vote. Architects do serve on sub-committees as advisory members, however, they are not permitted to vote. As you can see, architects do not have a great deal to say as to what goes into a code change.

In addition to building codes, we have the following National standards:

NASI - American National Standards Institute

ASTM - American Society for Testing and Materials

Both of these standards represent a general agreement among makers, sellers and user groups as to the best current practice with regard to a specific problem. The standards, as a rule, cut across the whole fabric of production, distribution and consumption of goods and services. These standards reflect a national concensus of manufacturers, consumers, technical and professional organization. They are widely used by industry, commerce, and Municipal Governments.

The National Fire Protection Association is also a non-profit organization that is recognized internationally as a clearing house for information on fire protection, fire prevention, fire fighting procedures, and life safety. It publishes over 225 codes, standards and recommended practices and manuals on related subjects. The NFDA National Electrical Code is well known for a standard. Its membership is open to all. In addition to standards, they print Fire Journals and numerous technical reports. Many of the Standards have been adopted into Federal/OSHA (Occupational Safety and Health Standard) regulations.

I do not wish to tread on the subject that will be covered by the next speaker--however, I would like to mention some of the problems we architects have.

Many of the Federal/OSHA requirements were taken from NFPA regulations. NFPA-101 was used extensively. In some cases, OSHA requirements were not copied in total nor taken out of context. There are also building code provisions in 101 which conflict with the provisions of the model code. Sometimes it is near impossible for the design profession to comply with local codes and Federal/OSHA.

Many States have adopted their own State/OHSA Plan. In doing this they have adopted equal or better provisions to that required by the Federal Government.

The underwriter laboratories is another non-profit organization that maintains and operates laboratories for the examination and testing of devices, systems, and materials to determine their relation to life, fire, casualty hazards and crime prevention. Its test facilities are used extensively.

If you look closely at our model codes, regulations and standards, you will see that they have been based on experience and very little scientific background. Many of our test procedures lack validity. There is a creditability gap due to the inability of small scale testing to reflect performance in actual conditions. Many tests procedures are developed with the idea of offering as little as possible and not what it takes to perform well. Some of our test procedures do not recognize the toxicity of the products of combustion.

A classic example is the use of plastics in construction and furnishings. During the 1960's cellular plastic products entered the building materials market and were and are used in substantial quantities for insulation, structural members, decorative trim, and interior wall panels. Because of their excellent insulating properties, adaptability and costs, the cellular plastic market has steadily increased. However, to gain full access to the building market the product has complied with flammability requirements of the model building codes.

When codes were originally developed, fire involved relatively small losses in human life, the first codes focused on structural performance of a building. It was not until the Cocoanut Grove fire in which hundreds of occupants died that the codes have changed and our concerns turned to interior wall finishes and furnishings.

Many of the government agencies are participating in the pursuit of knowledge. The Department of Commerce, the National Bureau of Standards, the National Science Foundation as well as our own AIA Research Corporation are involved in research and educational programs.

During the past 20 years, our understanding of earthquakes has increased with the theory of plate techtonics. Ninety percent of all earthquakes occur in plate boundaries where plates push into one another and one slides beneath the other. Seismic activity occurs on the west coast because we are on the edge of the plate. Ten percent of the earthquakes occur within the plate boundaries, so earthquakes are expected and occur in other areas.

Buildings being planned in a seismic risk area should be planned for earthquake hazard. Consideration should be given to the architectural as well as structural elements. For instance heavy shelving, library stacks, light fixtures and ceilings should be adequately braced.

In closing, I must emphasize the need for careful planning of all of the design and life safety elements after obtaining the best possible advice from all competent sources.